Appendix F:

Staffing and Qualifications

FIRM QUALIFICATIONS

Siebein Associates, Inc. established in 1981 in Gainesville, Florida is a leading acoustical consulting firm that specializes in sound assessment and analysis for shooting ranges and noise mitigation design for facilities using a variety of small arms, heavy weapons, field measurement; research; development of computer programs; and design of state, federal, public, and military and police training facilities. This has included work for firing ranges around the world for the US military, federal agencies such as the FBI, Capitol Police and FLETC as well as police training and privately owned ranges. We have also conducted research on firearms noise measurement and mitigation for the National Rifle Association and the National Science Foundation.

The firm has worked on over 1100 projects worldwide and is very experienced with work on police and recreational shooting facilities in the vicinity of residential neighborhoods. We have also worked with a number of municipalities to develop noise ordinances, participated in public hearings for noise impact related work, and worked on ANSI and ASTM committees to draft acoustical standards. Measurement, modeling and prediction of noise levels from impulsive sounds like gun fire in complex environments using field measures, computer models, and auralizations is a particular strength of the firm.

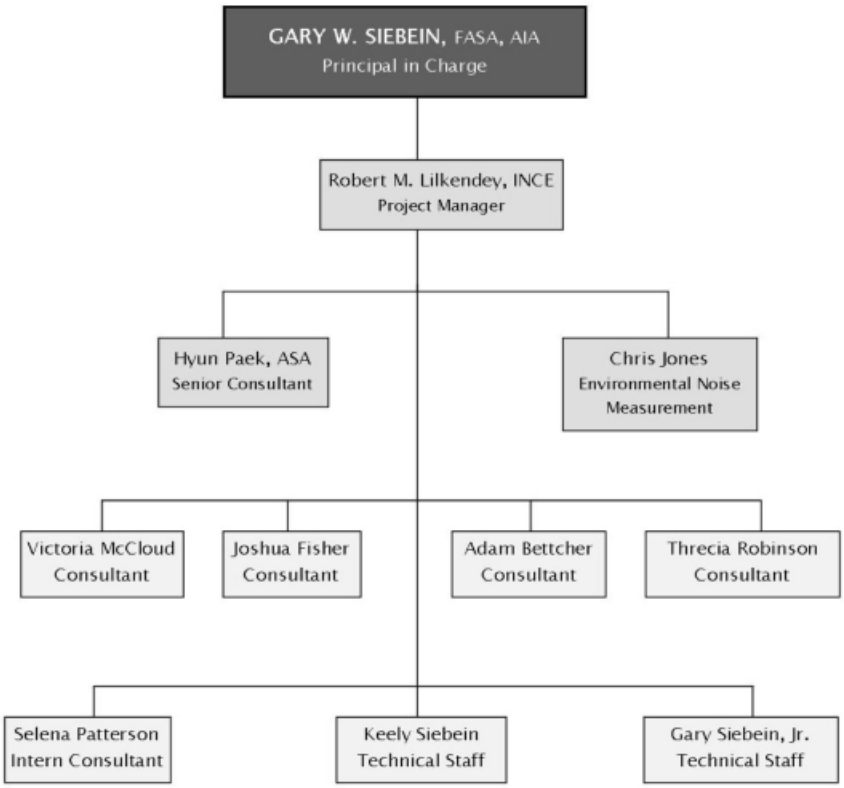


Figure 1. Organizational Chart

Table 1. Staff Roles and Responsibilities

Name	Role	Responsibility
Gary W. Siebein, FASA, AIA	Principal-in-Charge	Experimental Design Field Measurements Quality Control Review of Work
Robert M. Lilkendey, INCE	Project Manager	Experimental Design Field Measurements Manage Data Analysis and Report Production
Hyun Paek, ASA	Senior Consultant	Project Data Analysis and Field Measurements
Chris Jones	Environmental Noise Measurement	Project Data Analysis and Field Measurements
Adam Bettcher	Consultant	Project Data Analysis and Field Measurements
Joshua Fisher	Consultant	Technical Assistance with Report Preparation
Threcia Robinson	Consultant	Technical Assistance with Report Preparation
Victoria McCloud	Consultant	Technical Assistance with Report Preparation
Keely Siebein	Technical Staff	Field Measurements
Gary Siebein, Jr.	Technical Staff	Field Measurements
Selena Patterson	Intern Consultant	Technical Assistance with Report Preparation

Gary W. Siebein, FASA, AIA
Principal in Charge

Mr. Siebein has consulted for environmental noise projects over a 27 year career. Professor Siebein is also Director of the Architecture Technology Research Center at the University of Florida where he has implemented a long term research agenda to provide a scientific basis for environmental and building acoustic design issues. He has directed multi-year, multi-disciplinary projects in the measurement, modeling and prediction and simulation of building and environmental acoustics under the sponsorship of NSF and NSF and other public and private clients. He has developed innovative multi-channel digital acoustical measurement systems for building and environmental acoustics, developed methods to qualitatively assess noise impacts, developed physical scale modeling systems for environmental and building acoustics, developed computer models for a variety of acoustic situations and used these techniques to solve challenging acoustical issues on numerous projects worldwide.

Mr. Siebein has designed methods to accurately measure, model and predict the effects of impulsive sounds such as gunfire and demolition blasts associated with recreational shooting, and military and police training activities on adjoining properties as part of environmental assessment and ICUZ processes. He has worked with state and local law enforcement agencies, the private sector, the military, and federal agencies to develop comprehensive cost effective noise management plans for firing range and training facilities. This work has included design of baffled ranges, fully enclosed ranges, conducting community workshops and large scale experiments on sites to demonstrate acoustic effects of noise mitigation, computer modeling of noise contours, and auralization of sounds as they are heard at neighboring properties. He has consulted with communities to develop practical noise ordinances and served on an ANSI working group that developed a model community noise ordinance. He also serves on ASTM Committee E33 on Environmental Acoustics which develops testing standards for building and environmental acoustics.

Mr. Siebein has written 5 books, 17 book chapters and over 200 technical articles on many aspects of architectural and environmental acoustics. He has presented and published numerous invited papers on architectural and environmental acoustics at local, regional, national and international acoustics meetings

Mr. Siebein has consulted on over 1140 projects since 1981. Similar project experience to the Island Lake Recreation Area Shooting Range include the following:

- FBI Acoustical Study, Quantico, Virginia
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, Virginia
- United States Capitol Police Practical Applications Center, Cheltenham, Maryland
- Federal Law Enforcement Training Center Indoor/Outdoor Range, Brunswick, Georgia
- Federal Law Enforcement Training Center, Cheltenham, Maryland
- Federal Law Enforcement Training Center, Charleston, South Carolina
- Okinawa Firing Rang, Okinawa, Japan
- Virginia Beach Police Firing Range, Virginia Beach, Virginia
- Caseyville Rifle/Pistol Club, Masacoutah, Illinois
- Maumee Police and Fire Training Facility, Maumee, Ohio
- Duval County Police Training Facility, Jacksonville, Florida
- Police Academy Firing Ranges, Phoenix, Arizona
- Marine Corps Recruit Training Facility, Parris Island, South Carolina
- Federal Air Marshals Firing Range Facility, Chicago, Illinois
- Montgomery County Public Safety Training Academy Additions & Renovations, Rockville, Maryland
- Manassas Park New Police Station Indoor Shooting Range, Manassas Park, Virginia
- Montgomery County Weapons Training Center, Conshohocken, Pennsylvania

EMPLOYMENT HISTORY

- Principal Consultant, Siebein Associates, Consultants in Architectural & Environmental Acoustics (1981-present)
- Professor, University of Florida Department of Architecture (1980-present)
- University Research Foundation Professor (1999-2002)
- Director, Architecture Technology Research Center (1985-present)
- Architectural design work in several small firms in southwestern Connecticut (1972-1980)

EDUCATION

- Master of Arts in Architecture, (1980) (thesis and course work in architectural acoustics) University of Florida Gainesville, Florida
- Bachelor of Architecture, cum laude, (1978) Rensselaer Polytechnic Institute Troy, New York
- Bachelor of Science, Deans List, Minor in Language and Literature, (1972) Rensselaer Polytechnic Institute, Troy, New York

LICENSE/REGISTRATION

- Registered Architect, State of Florida No.8846

PROFESSIONAL SOCIETIES

- Fellow, Acoustical Society of America (ASA)
- Member, Institute of Noise Control Engineers (INCE)
- Member, National Council of Acoustical Consultants (NCAC)
- Member, American Society for Testing and Materials (ASTM)
- Member, American Society for Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- Member, American Institute of Architects (AIA)
- President, Florida Chapter Acoustical Society of America

Robert M. Lilkendey, INCE

Project Manager

Mr. Lilkendey, Senior has consulted on environmental noise projects over 12 years and specializes in developing acoustical experiments designed to acquire significant acoustical data. He has the technical expertise to setup and operate sophisticated data acquisition systems and measurement devices. He processes data through a variety of internally developed acoustical models as well as uses proprietary software for acoustical predictions. He understands the level of acoustical privacy and freedom from distraction needed by residents and the impact that intruding noise from recreational gunfire can have on one's quality of home life. He has the professional experience to develop solutions to challenging issues and is qualified to provide expert witness testimony in defense of the scientific methods and principles used by the firm in the development of acoustical design solutions.

Mr. Lilkendey has worked on the following similar projects:

- Federal Law Enforcement Training Center Indoor/Outdoor Ranges 1-6 Environmental Acoustic Assessment (II), Brunswick, Georgia
- FBI 25 Meter Firing Range Acoustical Study, Quantico, Virginia
- FBI 500 Yard Precision Rifle Deck Acoustical Study, Quantico, Virginia
- United States Capitol Police Practical Applications Center, Cheltenham, Maryland
- Virginia Beach Firing Range Environmental Acoustic Assessment, Virginia Beach, Virginia
- AIS Quick Range Noise Study, Las Vegas, Nevada
- Blalock Lakes Clay Pigeon Range Noise Study, Newnan, Georgia
- Federal Air Marshals Firing Range Facility, Chicago, Illinois
- Manassas Park New Police Station Indoor Shooting Range, Manassas Park, Virginia
- Maumee Police and Fire Training Facility, Maumee, Ohio
- Montgomery County Public Safety Training Academy Additions & Renovations Rockville, Maryland
- Montgomery County Weapons Training Center, Conshohocken, Pennsylvania
- Rhino Outdoor Open Gun Range Study, Williston, Florida

EMPLOYMENT HISTORY

- Senior Consultant, Siebein Associates, Inc., Gainesville, Florida (2003—present)
- Senior Consultant, Jaffe Holden Acoustics, Inc., Norwalk, Connecticut (1997—2003)
- Graduate Teaching Assistant, University of Florida Department of Architecture (1997—1997)
- Consultant, Siebein Associates, Inc., Gainesville, Florida (1996—1997)
- Graduate Research Assistant, University of Florida Department of Architecture (1994—1995)

EDUCATION

- Master of Science in Architectural Studies (1997) University of Florida (thesis and course work in Acoustics)
- Master of Building Construction (1996) University of Florida
- Bachelor of Design in Architecture (1993) University of Florida

PROFESSIONAL SOCIETIES

- Member, Acoustical Society of America (ASA)
- Member, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- Corresponding Member, ASHRAE Technical Committee (TC 2.6) – Sound and Vibration (July 2007—present)
- Voting Member, ASHRAE Technical Committee (TC 2.6) - Sound and Vibration (July 2003—July 2007)
- Member, Institute of Noise Control Engineers

Hyun Paek, ASA

Senior Consultant

Hyun Paek, Consultant has worked for Siebein Associates for over 7 years. He specializes in detailed computer modeling construction and acoustical analysis based on data compiled from carefully designed acoustical measurements and experiments. He has technical and experiential expertise on developing three-dimensional acoustical prediction models with precision based on field measured acoustical data and physical environments including topography, vegetation, buildings, and other information specific to the site. He has participated in numerous environmental acoustical assessments from planning and design of acoustical measurements, conducting field acoustical measurements using sophisticated acoustical measurement devices, to developing economical noise mitigation strategies that are desirable for all parties involved.

Hyun Paek has worked on the following similar projects:

- Federal Law Enforcement Training Center, Charleston, South Carolina
- Federal Law Enforcement Training Center, Cheltenham, Maryland
- FBI 25 Meter Firing Range Acoustical Study, Quantico, Virginia
- FBI 500 Yard Precision Rifle Deck Acoustical Study, Quantico, Virginia
- United States Capitol Police Practical Applications Center, Cheltenham, Maryland
- Okinawa Firing Rang, Okinawa, Japan
- Virginia Beach Firing Range, Virginia Beach, Virginia
- Broward Community College Institute of Public Safety, Ft. Lauderdale, Florida

EMPLOYMENT HISTORY

- Consultant, Siebein Associates, Inc. (2000-present).
- Graduate Teaching Assistant, Department of Architecture, University of Florida (1998-1999).
- Project Architect, Jeong Ik Architects and Engineers (1996-1997).
- Visiting Lecturer, Department of Architectural Design, Kaywon School of Art and Design (1997).
- Project Architect, Ilkun C&C Architects (1994-1996).

EDUCATION

- Master of Architecture (1994) University of Pennsylvania
- Bachelor of Science in Building Construction (1992) University of Washington
- Bachelor of Arts in Architectural Studies (1992) University of Washington

PROFESSIONAL SOCIETIES

- Member, Acoustical Society of America
- Member, Florida Chapter Acoustical Society of America

Chris Jones, Consultant has worked for Siebein Associates for over 3 years. He specializes in acoustical field measurements and experiments. He has conducted many environmental field measurements using sophisticated acoustical measurement devices to assist in developing economical noise mitigation strategies. Mr. Jones has worked on the following environmental noise projects:

- Manatee County Road Noise Stipulation, Manatee County, Florida
- Georgia Motocross Practice Facility Noise Measurements, Cairo, Georgia
- GL Homes Dubois Traffic Noise Study, Palm Beach, Florida
- Douglass Grand Condominium & Mixed Use Building, Winter Park, Florida
- Riva Trace Traffic Noise Study, Manatee County, Florida
- Bonner Property Train Noise Study, Sanford, Florida
- Cargor Traffic Noise Study, Manatee County, Florida
- Sweetwater Preserve Environmental Acoustic Assessment, Bradenton, Florida
- River Club Park Environmental Acoustic Assessment, Bradenton, Florida
- Florida Rock Environmental Acoustic Assessment, Newberry, Florida
- Shriner's Hospital for Children, St. Louis, Missouri

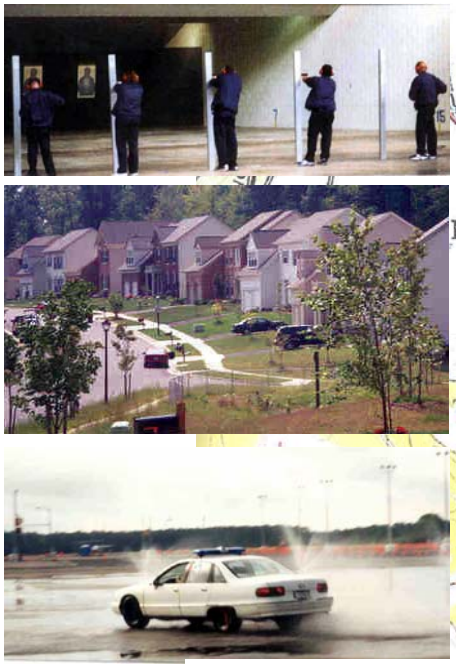
Joshua Fisher, Consultant has worked for Siebein Associates for over 2 years and specializes in the study of sonic environments, specifically frequency characteristic analysis of sound sources. Mr. Fisher holds a Master of Architecture degree and a Bachelor of Design degree both received from the University of Florida. He also holds an Associate of Arts degree from Edison Community College.

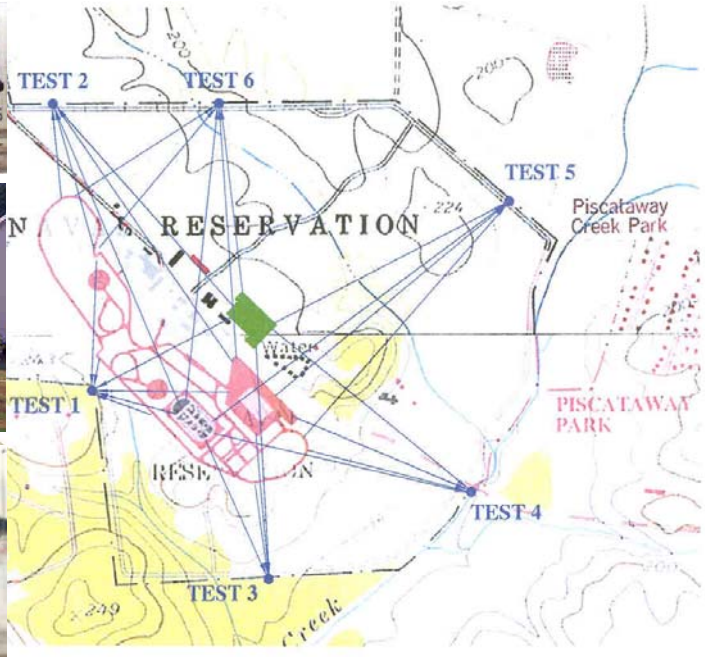
Adam Bettcher recently joined the firm as a Consultant. Mr. Bettcher conducted field measurements, and data analysis for the Island Lake Shooting Range project in Brighton, Michigan. Mr. Bettcher holds a Master of Architecture degree and a Bachelor of Design in Architecture degree both from the University of Florida in Gainesville, Florida.

Threcia Robinson recently joined the firm as a Consultant. Ms. Robinson provided technical assistance for preparation of the report. Ms. Robinson holds a Master of Architecture from the University of Florida in Gainesville, Florida and a Bachelor of Arts Honors Degree in French/ Media Studies from the University of Leeds in the United Kingdom.

Victoria McCloud recently joined the firm as a Consultant. Ms. McCloud provided technical assistance for preparation of the report. Ms. McCloud holds a Master of Architecture from the University of Florida in Gainesville, Florida and a Bachelor of Arts, Interior Design from Florida State University in Tallahassee, Florida.

SELECTED PROJECT EXPERIENCE

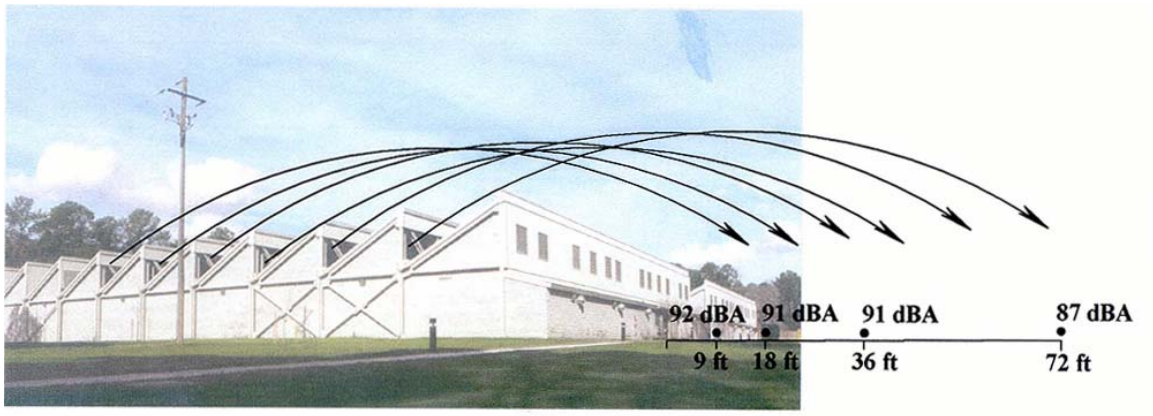




FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Cheltenham, Maryland

Siebein Associates conducted a sound assessment and noise analysis for new enclosed firing ranges and driving training facilities on nearby communities. Noise measurement levels were taken at over 40 locations in the community and the existing sonic environment was characterized using a combination of quantitative metrics such as Ldn's and soundscape terms. Field measurements were conducted of long term sound levels and individual event levels for firearms training at multiple indoor, partially enclosed and outdoor firing ranges at an existing facility. The data was used as source data in computer model studies using the SA Environmental Noise Analysis program of noise impacts from a number of design alternatives. The field measurements were also made at distances away from the sources that would be found at the proposed facility as a method to calibrate the model studies. A variety of mitigation options were explored and recommendations presented.

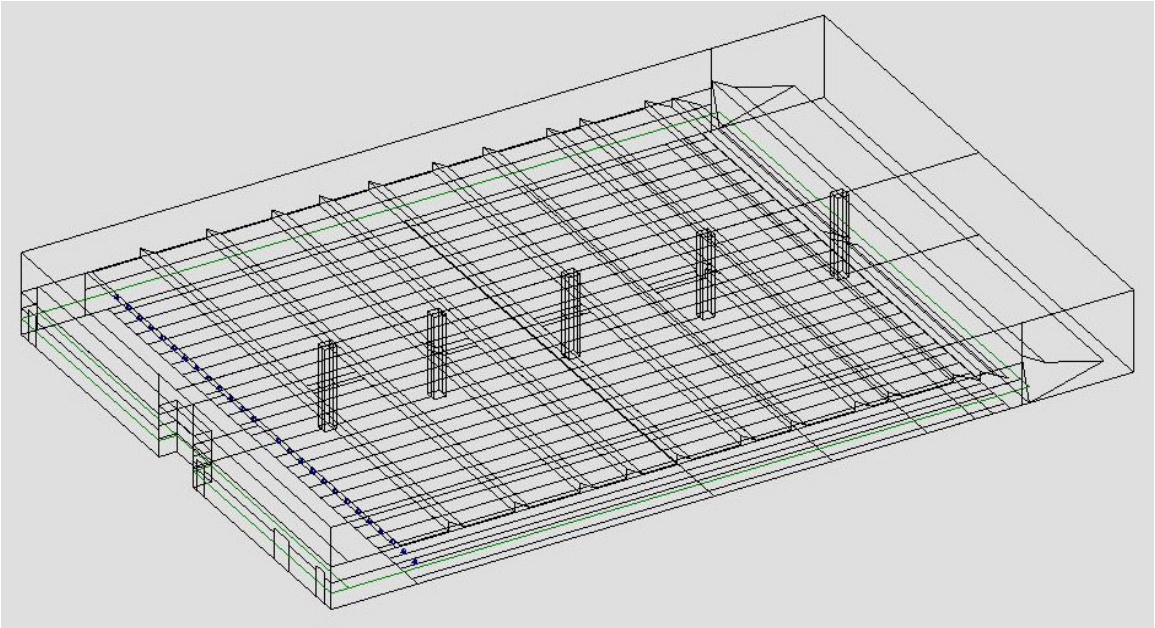
SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Brunswick, Georgia

Siebein Associates conducted a sound assessment and noise analysis new partially enclosed firing ranges on near by communities. Long term sound levels were recorded at critical locations in the community where complaints had been received. Detailed measurements of individual training events were also made both close to the source and in the neighborhoods. These data were used in computer model studies using the SA Environmental Noise Analysis program of design alternatives including range location, orientation, materials and baffling systems. Physical scale models were also built of design options for the partially enclosed ranges to study the directional effects of sound diffracted out through the openings into the community. The effects of moving the sound sources to different firing positions within the range was found to account for much of the variability in acoustical measurements made in the neighborhood in previous studies. Recommendations for to minimize noise propagation into the neighborhood were presented and constructed.

SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Charleston, South Carolina

Siebein Associates provided sound analysis and acoustical design recommendations for indoor firing ranges in Charleston, South Carolina. Mitigation to increase sound absorption and reduce harmful noise propagation was provided. A three-dimensional acoustic computer model was constructed to study sound propagation as shown in the Figure above.

SELECTED PROJECT EXPERIENCE

FBI FIRING RANGE ACOUSTICAL STUDY
Quantico, Virginia

Siebein Associates conducted a comprehensive evaluation of acoustic problems in large indoor/outdoor firing ranges; monitoring of OSHA noise exposure for instructors and students; development of software systems to evaluate hearing conservation issues from high-energy impulse noise from firearms; and integrated acoustical mitigation design for ranges with architectural, air-flow and lead abatement consultants.

SELECTED PROJECT EXPERIENCE

OKINAWA FIRING RANGE NOISE IMPACT STUDY
Okinawa, Japan

Siebein Associates conducted a sound assessment and analysis for expansion of range activities and construction for new ranges. Design criteria for off-site noise propagation were established by the military. The ranges were to be used for Special Forces firearms training activities. A combination of acoustical measurements at similar training facilities, computer model studies of proposed activities, and model calibration studies conducted in the field were used to evaluate proposed designs. Acoustical measurements of typical busy day training activities were recorded at for Army Special Forces operations at an existing facility. The acoustical data from the actual training activities were used in 4 different computer models to estimate sound levels at various locations around the proposed facility as affected by distance, topography and vegetation. Sophisticated military noise prediction programs were also used to independently estimate noise contours based on the projected number of personnel, rounds per day and weapons used in the training exercises. Methods to reduce sound levels were evaluated as well in a series of optimization studies.

SELECTED PROJECT EXPERIENCE

CITY OF VIRGINIA BEACH FIRING RANGE
Virginia Beach, Virginia

Siebein Associates worked with city and police personnel, and residents to conduct a sound assessment and analysis of existing firing range noise on nearby communities. A computer model study was constructed using the SA Environmental Analysis program of design alternatives to provide recommendations for mitigation.

SELECTED PROJECT EXPERIENCE

MAUMEE POLICE AND FIRE TRAINING FACILITY
Maumee, Ohio

Siebein Associates conducted a sound assessment and analysis for the proposed Maumee Fire and Police Training Facility to determine the noise impact of firearms training activities on the surrounding communities. Acoustic measurements were made at the proposed site and in the surrounding community of police officers firing shotguns and pistols at the site of the proposed Firing Range. Noise mitigation strategies were presented.

SELECTED PROJECT EXPERIENCE

BLALOCK LAKES CLAY PIGEON RANGE NOISE STUDY
Blalock, Georgia

Siebein Associates, Inc. conducted a sound assessment and analysis to determine noise mitigation strategies to reduce noise associated with clay pigeon shooting events at an adjoining residential property.

SELECTED PROJECT EXPERIENCE

UNITED STATES CAPITOL POLICE PRACTICAL APPLICATIONS CENTER
Cheltenham, Maryland

Siebein Associates conducted a sound assessment and analysis to establish acoustical design criteria for background noise levels from building and simulation equipment; selection of room finish materials; sound isolation between critical spaces; acoustical measurements and analysis to determine occupational hearing loss issues relative to the range usage by instructors and students during firearms training.

SELECTED PROJECT EXPERIENCE

CASEYVILLE RIFLE AND PISTOL CLUB
Masacoutah, Illinois

Constructed a computer model for proposed shooting range to produce noise contours for the projected number and types of weapons to be used at the new range.

MONTGOMERY COUNTY WEAPONS TRAINING CENTER
Conshohcken, Pennsylvania

Conducted acoustical analysis and design recommendations to reduce noise from gun fire within the firing range and reduce the transfer of gun fire noise to the Fire Academy classrooms and adjoining properties.

ROCKVILLE POLICE ACADEMY FIRING RANGE
Rockville, Maryland

Conducted acoustical analysis and design recommendations for the construction of a new firing range to allow for simultaneous use with adjacent offices and nearby classrooms. Acoustical measurements were taken of firearms training in the existing range to estimate noise impact at nearby receiver properties and to recommend acoustical upgrades to the construction of the building envelope.

AIS QUICK STUDY
Las Vegas, Nevada

Conducted acoustical analysis of sound levels of Quick Range structures in the Control Room and just outside the Range to determine compliance with the performance criteria based on OSHA and NIOSH permissible sound level limits. A computer model was constructed to study alternate range sizes to determine equivalent sound levels with substitute sizes and materials used for the ranges.

RHINO OUTDOOR OPEN GUN RANGE
Williston, Florida

Conducted sound assessment and analysis of shotgun blast noise from the Rhino Outdoors open gun range at the property line of adjacent and nearby residences and businesses to determine the extent to which the noise exceeds the noise level limit described in the Levy County Code of Ordinances.

SELECTED PROJECT EXPERIENCE

MARINE RECRUIT TRAINING FACILITY
Parris Island, South Carolina

Provided acoustical design of a U.S. Marine Corps Large Group Training Facility at Parris Island, South Carolina including room acoustic design, sound isolation for large public restrooms and mechanical equipment and interface with Marine audio-visual systems.

CITY OF PHOENIX POLICE TRAINING FACILITY
Phoenix, Arizona

Conducted acoustical analysis and design recommendations for existing outdoor and indoor firing ranges proposed for a major expansion of this large facility in suburban Phoenix.

DUVAL COUNTY SHERIFF'S OFFICE FIRING RANGE NOISE IMPACT STUDY
Jacksonville, Florida

Conducted acoustical measurements at existing indoor and outdoor firing ranges. Determined existing and future noise impact for expansion of outdoor ranges. Investigated enclosed and partially enclosed options for range development to minimize noise impact on nearby residences.

MANASSAS PARK NEW POLICE STATION INDOOR SHOOTING RANGE
Manassas Park, Virginia

Conducted acoustical analysis and design recommendations to reduce sound from fire arms in the firing range on the ground floor to offices above and to the side of the range. Conducted computer model studies using the SA Environmental Analysis program of design alternatives to proved recommendations for noise mitigation.

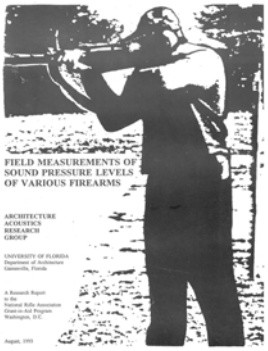
FLORIDA DEPARTMENT OF LAW ENFORCEMENT HEADQUARTERS
Tallahassee, Florida

Conducted acoustical measurements and design for indoor firing ranges located in close proximity to the Director's Office and other noise sensitive locations in this major headquarters facility for a large law enforcement agency.

SELECTED PROJECT EXPERIENCE

Field Measurements of Sound Pressure levels of Various Firearms

Research to document methods and a digital data acquisition system to record peak pressure levels, sound exposure levels and other metrics of interest produced by a variety of firearms. A catalog of peak pressure levels and octave band sound exposure levels for various firearms was produced to aid the NRA in assessing noise impacts of range facilities.



Field Measurement of the Insertion Loss of Earth Berms

Field measurements of the insertion loss of earth berms surrounding outdoor firing ranges were compared with estimates of insertion loss calculated by a variety of methods in the literature. Advantages and disadvantages of various computational methods and field measurement techniques were evaluated. Presented to the National Rifle Association.

Preliminary Acoustical Analysis of Existing Indoor Firing Ranges

Research presented to the National Rifle Association (NRA) to document methods to accurately measure impulsive sounds produced by firearms; develop acoustical design guidelines for indoor firing ranges including transmission loss of wall, floor and ceiling assemblies and interior finish materials; and present case studies of the acoustical design of ranges.

"Project Design Phase Analysis Techniques to Evaluate the Acoustical Environment of Buildings and Listening to Buildings"

Developed a multi-channel digital data acquisition system to compute acoustical metrics based on impulse response theory to assess interior and exterior situations as part of 10 years of work. The system was used successfully in full size environments as diverse as concert halls, construction sites and firing ranges. It was also used in scale model studies of interior acoustical qualities in concert halls and exterior sound propagation in police training facilities. Impulse responses acquired in the field were also convolved or mixed with recorded sounds to present aural simulations of sounds as they were heard in complex environments. Case studies comparing full size and scale model measurements in actual design situations were presented. Presented to the National Science Foundation.